

PATENT SPECIFICATION

NO DRAWINGS

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Process for preparing a fruit flavoured beverage mix.

COMPLETE SPECIFICATION

We, GENERAL FOODS CORPORATION, a corporation organized under the laws of the State of Delaware, United States of America, of 250 North Street, White Plains, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a new beverage preparation of the fruit flavoured type. More particularly, the invention relates to a beverage preparation of the type described which is adapted to be prepared and marketed in a substantially dry powdered form and which is capable of being reconstituted by the addition of cold water at the time of consumption to provide an instantly prepared fruit flavoured beverage; also, the invention relates to agents for use in such preparations to improve the appearance and palatability thereof.

Prior to the present invention, beverage mixtures of the fruit acid type have been prepared by mixing fruit acid such as tartaric acid with sugar and suitable colour and fruit flavour. Such preparations, however, have had a very limited use in commerce because they lack the non-watery mouth feel and fullness of natural fruit juice. Moreover, they have been lacking in the desired property of opacity or cloud inherent in natural fruit juice. Thus, fruit-flavoured beverages which are not opaque or turbid have an artificial appearance which is not consistent with the appearance of natural fruit juice. It would be desirable to incorporate a substantially stable clouding agent in an instant powdered fruit juice-like composition which agent avoids both clarification of the beverage either by sedimentation of the clouding agent or its separation out on the surface of the beverage. At the same time, it would be desirable to

provide an instantly prepared beverage mix which offers the mouth feel of natural fruit juices such that the mix can be employed as a palatable beverage "bracer" which may or may not have incorporated therein nutritional agents like mineral salts and vitamins.

It is a primary object of the present invention to provide a dry powdered fruit flavoured beverage composition of the character indicated which can be readily reconstituted in cold water with gentle spoon stirring and which, upon such reconstitution, will produce a fruit flavoured beverage closely resembling the opacity, appearance, mouth feel and palatability of natural fruit juices. It is a further object of this invention to provide a fruit flavoured beverage mix capable of fortification with desirable vitamins and minerals. Other objects and advantages of the invention will appear from the following description and examples presented.

The objects of the present invention are in general attained by admixture with an edible acidic substance, sugar, flavouring and colouring ingredients of a dried emulsion of a plastic fat and a hydrophilic encapsulating colloidal material, typically a water-soluble gum like gum arabic, gum tragacanth, gum acacia and the like, wherein the fat is present in a minor proportion and the colloidal water-soluble gum is present in a major proportion. The term "edible acidic substance" is intended to describe edible acids like citric, tartaric, adipic, fumaric and like edible oxy-acids as well as the salts and acid salts of these acids, like sodium citrate, the tartrates, and mixtures of these acids, salts and acid salts. The dried emulsion is characterized as comprising a matrix of water-soluble constituents having as the dispersed phase therein discrete small particles of fat. In achieving such a matrix and dispersed fat phase, sufficient colloidal material should be employed to insure that

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when an emulsion prepared from an aqueous colloidal suspension having melted fat particles dispersed therein is dried by such means as a spray dryer to a stable moisture content below 5% and in the order of 3% the fat will be effectively released in discrete colloidal form when the emulsion is reconstituted. The plastic fat of the dried emulsion should have a melting point whereat, upon reconstitution of a beverage mix containing the dried emulsion, the fat will not coalesce and "cream off" to the surface of the reconstituted beverage.

In achieving the dried emulsion of the aforesaid character, that is, of a type which will be readily reconstitutable in water with gentle stirring and which will neither float to the top of the liquid nor accumulate at the bottom of the liquid, it is important to homogenize the aqueous emulsion of the water-soluble gum and the plastic fat to the extent that discrete particles are formed and also to the extent that the dried emulsion has a desired particle size distribution. In practice, the preferred procedure for achieving this discrete emulsion of plastic fat particles is to process an aqueous suspension of melted plastic fat and gum arabic through a homogenizer which essentially comprises a floating cylindrical valve having longitudinal flutes which guide the valve within an annular seat, the valve engaging a cylindrical plunger having a chamfered surface urged against a chamfered surface on the valve seat by spring pressure. By the shearing force applied to the aforesaid suspension as it passes between the plunger and the valve seat, globules of melted plastic fat are sheared and reduced in size; the degree of

homogenization is expressed in terms of pressure applied to the emulsion intermediate, the chamfered surfaces of the valve seat and the plunger. As homogenization pressure is increased, the ability of the dried emulsion to display desired cloud properties is improved. Thus, as homogenization pressures of 500 psig. and above and ranging from 500-2000 psig. are practised, the average particle size of the dried emulsion will increase and the ability of the dried emulsion to demonstrate improved cloud properties will also increase. At homogenization pressures below 500 psig. and dried emulsion will not demonstrate desired cloud properties but rather, when incorporated into a beverage mix, will produce a quantity of unsightly floating scum at the surface of the beverage preparation. When no homogenization is practiced before spray drying the aqueous suspension of gum arabic or other water-soluble gum and melted plastic fat, the average particle size will be quite small such that when the dried emulsion is employed in combination with other beverage mix ingredients, it will drop to the bottom of the liquid as an unsightly "precipitate." Although the foregoing phenomena have been described with reference to data obtained when employing a Manton-Gaulin homogenizing valve, other means for effecting emulsification of the melted fat globules may be employed and indeed a plurality of homogenizing valves in series may be practiced; hence, an ultra-sonic homogenizer or a colloid mill can also be employed.

The influence of homogenization pressure on cloud properties will be evident from the following table:

Effect of Homogenization Pressure on Cloud Properties
Screen Analysis (U.S. Sieve Series)

| Screen Analysis (U.S. Sieve Series) | | | | | | |
|-------------------------------------|---------------------------------|---|-------|------|------|---|
| Run No. | Homo- genization Pressure | % Cloud ("+"="greater than" and "-"="less than") | | | | Remarks |
| | | +20 | +30 | +100 | -100 | |
| 85 | A 2000 psig. | Trace | 1% | 91% | 8% | 100% dried emulsion |
| | B 1000 psig. | Trace | Trace | 97% | 3% | 100% dried emulsion |
| | C 500 psig. | Trace | Trace | 89% | 11% | 90 g. dried emulsion + 10 g. tricalcium phosphate |

Emulsion Stability After 24 Hours and Emulsion Opacity

| Run No. | Emulsion Stability | Emulsion Opacity Klett-Summerson (K.S.) Units |
|---------|--------------------|---|
| A | Good | 199 |
| B | Good | 196 |
| C | Good | 209 |

[For information as to the method of measuring opacity in "K.S." units, see "Journal of Biological Chemistry," Vol. 130, pp. 149-66 (1939).]

In general, it has been observed that the dried emulsion should have a particle size

distribution whereat no more than 25% by weight passes through a U.S. Sieve Series No. 100 screen. Since the dried emulsion may require the incorporation of an agent to promote flowability, viz., tricalcium phosphate (TCP), and since the lack of flowability can influence particle size distribution the above figure on average particle size can be expressed by stating that not more than 65% should pass through a U.S. Sieve Series No. 100 screen when 10% by weight TCP is blended therewith. In addition, 100% of the dried emulsion, when blended with 10% by weight TCP,

about 0.35 grams/cc.

A fruit flavoured beverage mix was prepared employing the foregoing cloud and the above specified low viscosity CMC in accordance with the following formulation:

| Ingredients | Parts by Weight |
|--|-----------------|
| Sucrose | 89.28 |
| Citric Acid | 5.53 |
| Clouding Agent | 2.28 |
| 10 Sodium Carboxymethyl Cellulose (low viscosity) | 0.90 |
| Tricalcium Phosphate | 0.49 |
| Trisodium Citrate | 0.70 |
| Vitamin C | 0.47 |
| 15 Tenfold Orange Oil | 0.26 |
| Vitamin A | 0.04 |
| Colour (mixture of F. D. & C. No. 5 and F. D. & C. No. 6 yellow) | 0.01 |

Sixty-five grams of the above beverage mix was reconstituted in a pint of water and produced a beverage demonstrating highly acceptable mouth feel, cloud stability, and natural fruit juice appearance. After four days' standing in a refrigerator at a temperature of 45°F., no apparent separation of the discrete plastic fat particles occurred.

WHAT WE CLAIM IS:

1. A fruit flavoured beverage mix comprising in combination an edible acidic substance, sugar, a fruit flavour and a colouring ingredient, and a dried emulsion of a homogenized plastic fat and a water-soluble gum, the fat being present in a minor proportion and the gum being present in a major proportion, the dried emulsion having a particle size distribution whereat 100% passes a U.S. Sieve Series No. 20 screen and no more than 25% passes a U.S. Sieve Series No. 100 screen.

2. A fruit flavoured beverage mix according to claim 1 wherein the fat has been homogenized at a pressure above 500 psig.

3. A fruit flavoured beverage mix according to claim 1 or 2 wherein the fat has been homogenized at a pressure between 500 and 2000 psig.

4. A fruit flavoured beverage mix according to any one of the preceding claims wherein an alkali metal salt of carboxymethyl cellulose has been added thereto.

5. A fruit flavoured beverage mix comprising in combination an edible acidic substance, sugar, a fruit flavour and a colouring ingredient, and a dried emulsion of a homogenized plastic fat and a water-soluble gum, said emulsion having a particle size distribution whereat 100% passes a U.S. Sieve Series No. 20 screen and not more than 25% passes a No. 100 screen, and an alkali metal salt of carboxymethyl cellulose having a particle size distribution such that 100% passes a U.S. Sieve Series No. 30 screen and not over 80% passes a U.S. Sieve Series No. 100 screen.

6. A fruit flavoured beverage mix substantially as herein described and exemplified.

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